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Lord Viscount Exmouth &c.
with the Author's Respectful Com.

SOME

Farther Observations

ON THE SUBJECT OF

THE PROPER PERIOD

FOR

AMPUTATING

IN

GUN-SHOT WOUNDS;

ACCOMPANIED BY THE

Official Reports

OF

THE SURGEONS EMPLOYED IN HIS MAJESTY'S SHIPS AND
VESSELS AT THE LATE BATTLE BEFORE ALGIERS.

BY

A. COPLAND HUTCHISON,

Late Surgeon to the Royal Naval Hospital at Deal;
Surgeon Extraordinary to His Royal Highness the Duke of Clarence;
Fellow of the Royal College of Surgeons in London,
And of the Medical and Chirurgical Society;
Consulting Medical Officer to the General Penitentiary, Mill-Bank,
Westminster, &c. &c.

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1817.



X

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TO
SIR GILBERT BLANE, Bart.
M. D. and F. R. S.
PHYSICIAN TO HIS ROYAL HIGHNESS
THE PRINCE REGENT,
&c. &c. &c.

Dear Sir,

Impressed with a high sense of your literary attainments, and of that ardent zeal to benefit the public service, and to lessen the sufferings of our fellow-creatures, which has marked your character through a long and most useful life to society; I beg permission, as a mark of my great respect and esteem, to dedicate to you the observations contained in the few following pages.

I have the honour to be,

Dear Sir,

Your very obliged humble Servant,

A, COPLAND HUTCHISON.

*Spring Garden, London,
25th Jan. 1817.*

Lately published by the same Author,

I.

A LETTER ON THE SUBJECT OF THE OPERATION FOR POPLITEAL ANEURISM.

Price 1s. 6d.

II.

SOME PRACTICAL OBSERVATIONS IN SURGERY, embracing the Subjects of Amputation, Erysipelas, Necrosis, internal Abscess, &c. &c.

Price 6s.

ON
AMPUTATION
IN
GUN-SHOT WOUNDS,
&c.

Soon after the publication of my late work, entitled, *Some Practical Observations in Surgery*, embracing more particularly the important subject of amputation in gun-shot wounds; the expedition sent against the piratical state of Algiers, under the command of Lord Exmouth, returned to Spit-head. The squadron consisted of five ships of the line and five frigates, besides sloops of war and bomb-vessels. It will be in the recollection of my readers, that in this little fleet there were more men killed and wounded in proportion to the force employed, than in any preceding conflict, perhaps, in the annals of Great Britain. It will

services throughout the whole of the late wars, now happily terminated, and peace restored to Europe, by the successful issue of this last tremendous battle.

In some of the ships, cots were prepared and slung for the accommodation of the wounded; by means of these the men were gently lowered down directly into the cockpit with all the care and attention which the importance of the case demanded. By these precautions the patients were exempt from the irritation consequent on the ruder mode of conveyance heretofore practised, and the medical officers were enabled to afford more immediate relief to the necessities of the sufferers. I mention this circumstance the more particularly, as it appears to me to be one of the greatest improvements in the preparatory arrangements of the naval surgeon going into action, for it necessarily tends to render the success of his capital operations much more certain; besides the important consideration of lessening the immediate sufferings of the wounded.

On the return of the squadron into port, I was extremely anxious to learn the particular periods at which the amputations had taken place, the nature of the wounds requiring that operation, and the different results. Deeply impressed with the momentous importance of the subject in question to the army and to the naval service, as well as to humanity in general, I lost no time in addressing a letter to the Commissioners for sick and wounded Seamen, &c. The Commissioners, with the readiness and zeal which have invariably marked their conduct when the good of the service was in view, immediately facilitated my wishes by procuring the annexed Replies to the Queries contained in my letter. These documents so fully illustrate and corroborate the truth of the doctrines which I previously endeavoured to inculcate, that I hasten to lay them before the profession, in the hope of settling definitively a question so long agitated, so interesting to humanity, and of such vital consequence to the national service in future wars.

As

As some of these official communications are very extended, and would occupy much space ; I trust, I shall be excused by the writers in giving such parts only, as appear to bear more directly on the subject under consideration ; and I shall endeavour to give such extracts with all due candour and fairness, stating the opinions of those gentlemen who oppose or confirm the point in controversy.

Those surgeons who may appear to have been less successful in the general result of their operations than others who pursued a different plan, and were actuated by other sentiments, cannot in justice reflect on themselves, however much it may be lamented, particularly in the sea service, as their mode of proceeding was influenced by the opinions of gentlemen of high professional talents, and of acknowledged experience in practical surgery. The principal object of this inquiry is, to point out the dangerous tendency of those opinions, which appear to be founded on plausible reasonings

deduced from effects theoretically supposed to occur, rather than the result of actual experience or just observation.

After the perusal of these documents, it will in the first place be necessary to consider those parts in which the writers make mention of shock and alarm to the constitution on being badly wounded in battle, as the reason assigned for *deferring* amputation till these dangerous symptoms had subsided, with its results; secondly, those in which the existence of such affections is positively denied, and consequently where amputation had been *immediately* performed, with the results also; and, lastly, the statement of other surgeons of that fleet, who noticed the circumstance of a pallid countenance, feeble pulse, and tendency to syncope occurring in some few instances immediately on the sudden loss of blood from a severe wound requiring amputation. These, I think, are the leading facts, and embrace the principal contents of the different papers under review,

First,

First, then, as to the shock and alarm; the only medical officer who mentions this occurrence is the surgeon of the Impregnable; but in his report he merely states, that “ he did not amputate till the battle had terminated; and that it appeared to him, the constitution of his patients had entirely recovered from the *shock* and *alarm* usually experienced on being wounded in battle.”— Now, he enters into no statement respecting the symptoms and appearances generally characterizing *shock* and *alarm* of men wounded in battle; and, therefore, it may be fair to infer, that such constitutional derangement was purely imaginary and hypothetical; else, why not particularly describe the attending symptoms which induced him to suspend the operations till the battle had terminated? The probability is, that his judgment was influenced and controlled by the published opinions of certain celebrated writers on this interesting subject, as he adopts precisely their phraseology, and not regulated by personal experience and observation. In this ship there were *eleven* amputations performed, legs and arms; but

no case of double amputation occurred*, and *nine* out of that number died. Of the two that recovered, one was operated upon below the knee, and the other above the elbow.

The authors alluded to above, make much mention of *shock and alarm to the constitution* ; a phrase, vague, ambiguous, and undefined ; but great part of this affection called shock, must no doubt be understood to consist in the state of the mind.—Now, in the first place, we know, that, in the ardour of battle, the same excitement of mind continues for some time after the actual infliction of the injury, however severe, as is well known to those who have witnessed the patriotic exultation of seamen, who, under the knife, have joined in the shouts of victory ! The depression of mind, so unfavourable to the success of an operation, does not come on till the spirits are exhausted by pain and loss of blood. Secondly, with regard to pain itself, the same rule holds ;

* Some days after the battle, a second amputation occurred in one case, and the patient died.

for it is well known, that the most severe wound is hardly felt at first, and that the smart terminating in agony, does not come on for some time, a time which may, and should be anticipated by operation.

The surgeons of the *Leander* and *Severn* amputated *immediately*; all the men, excepting two, were operated upon within half an hour of their being removed to the cockpit. These gentlemen, with the surgeon of the *Superb*, *positively deny* the existence of the slightest appearance of *shock and alarm to the constitution*, though, on a reference to their respective papers, it will be seen, that the wounds requiring amputation were, in many instances, even more severe than those which occurred on board the *Impregnable*.

In the *Leander* fifteen patients underwent amputation, two of whom lost *both thighs* very high up, and one was a hip joint case; with other severe injuries; and these were the only men that died in consequence of their wounds and the subsequent operations. We must except, however, one man who
did

did not belong to the ship, and who had been thrust through the stern port from a gun-boat during the engagement ; in consequence of which, it was impossible to ascertain how long he had been wounded before the operation was performed. Thus *eleven* cases recovered after having undergone amputation. It is proper to mention, however, that two of this number died after the cicatrization of their stumps, one of phthisis pulmonalis, and the other of bilious remittent fever ; but these deaths cannot be considered as militating against the principle I am so desirous to establish.

On board the *Severn*, four amputations occurred, namely, one arm and three thigh cases, all of which recovered. It will be seen, and is truly worthy of remarking, that one of these patients, far from suffering any shock or alarm, on having his leg completely carried off by a cannon-shot, very coolly and deliberately removed the handkerchief from off his neck, and wrapped it round the mangled stump, to stop the effusion of blood till he could reach the surgeon.

The

The surgeons of two or three of the ships speak of the danger that sometimes occurs from the sudden loss of a quantity of blood, on being severely wounded in battle, particularly the surgeon of the *Superb*; but in these cases even, the patients are stated to have been perfectly collected, and free from every thing like sensorial affection. It is here also proper to remark, that the above circumstance is observed upon in my publication already alluded to, page 9. The general effect of a sudden abstraction of blood from the system, is feebleness of pulse, pallid countenance, faintness, and even syncope; but all these apparently alarming symptoms are speedily removed by administering some generous cordial, as wine, diluted brandy, &c.—To these occurrences we cannot justly apply the doctrine of *shock and alarm to the constitution*, and in fact need not retard the operation beyond the period necessary to rouse the dormant powers of the system, by the means already pointed out; and which, at most, require not many minutes to effect.

The

The greater number of wounds inflicted by contending armies, are those arising from grape-shot and musket-balls; whereas in naval engagements the very reverse of this is the fact in an increased ratio; for, the wounds received in ships of war are generally produced, either by the direct stroke of a cannon-shot, of large dimensions, or, what is still more lamentable, by ragged fragments of timber violently rent from the planks or beams of the ship, impelled by balls infinitely larger than any ever employed in fields of battle. Wounds inflicted by splinters of wood, are always more extensive, accompanied with frightful contusions and lacerations of the soft parts,

If, then, there be any *shock or alarm to the constitution*, occasioned by gun-shot wounds, which should deter or interdict the army-surgeon from performing immediate amputation, when such an operation is deemed indispensably necessary; how much more alarming must we expect to find this mental shock among the wounded men in naval battles, whose injuries are found much
more

more serious and formidable, as we have fully shown in the preceding paragraph. But the truth is, that until a late writer talked of shock and alarm, unfortunately, in all cases of gun-shot wounds, and stated the danger of amputating before the constitution had recovered from these gratuitous and hypothetical affections, no such idea had ever entered the minds of our most experienced naval surgeons.

It has been very properly remarked, by some of the medical officers employed in the expedition against Algiers, that instances of fatal hæmorrhage had occurred, in consequence of the patients incautiously relaxing the tourniquets that had been applied for some time, to stop the effusion of blood, till the surgeon could find leisure to operate in regular succession, or until he thought himself justified in operating. But what man, let me ask, can bear the severe pressure of a tight ligature like the tourniquet, on a wounded limb, for four or six hours, without an effort to relieve himself from the painful stricture occasioned by the instrument, however short that period might be ? The pro-

bability and danger of such an occurrence may with propriety be urged as a strong argument in favour of immediate amputation, which would effectually guard against such fatal accidents. It is, indeed, scarcely possible to suppose, that a ligature could be continued for such a length of time, even on a perfectly sound limb, by which the circulation is impeded, or totally obstructed, without being attended with serious consequences, and even a risk of ultimate gangrene, not to mention the extreme suffering of the patient.

Since, in my recently published *Observations in Surgery*, I have entered pretty largely on the nature of the irritation consequent on gun-shot wounds, in which I endeavoured to demonstrate that it is not an immediate result, but an increasing affection in a greater or less degree, proportionably to the extent of the injury, and the nature of the parts wounded; I do not feel it necessary to say more here, excepting briefly to observe on gun-shot fractures of the extremities requiring amputation. Let us suppose, in wounds attended by such circumstances,

cumstances, the bones much shattered, and the patient left, for a few hours before the operation is had recourse to ; surely we are not to conclude that the unhappy patient, during this painful suspense, can remain in a tranquil or quiescent state : certainly not : the probability is, that the muscles of the injured member will be attacked with spasms, the limb more or less thrown into involuntary action, and the nerves, heretofore untouched, lacerated or grated upon by ragged points, detached fragments and sharp edges of the fractured bones, thereby increasing the irritation in an infinite degree.

In addition to the documents before us, illustrative of the fatal consequences generally attending deferred amputations in battle, I am authorized to state by ocular witnesses, that in two of the ships where this doctrine was fully acted upon, several officers and seamen, so wounded as to require immediate amputation, died in the cockpit, before the period had elapsed in which the surgeon felt himself justified or warranted to commence operating : two cases in particular,

ticular, one of which was badly wounded a little above the knee, and the other at the ankle; and it is necessary to remark, that all the amputations performed in that ship, were arm cases.

I had it originally in contemplation to have added a fifth Query, embracing this particular point; namely, “How many men, whose cases required amputation, died in the cockpit before you deemed yourself warranted to commence operating?” But, from motives of delicacy, I afterwards withheld it; trusting that, from the contrasted practice herein so amply adduced, conjoined to what has been previously stated, the question will now be considered by the profession as fully illustrated and finally settled.

The country, and the relatives of our brave defenders in future contests, will not, I trust, have to lament the uncertainty of a point in surgical practice of such vital consequence to humanity, on which the professors of this important science could not themselves agree. *Magna est veritas, et prævalebit.*

*The following are the official Documents
referred to at Page 4.*

Spring Garden, Oct. 29, 1816.

GENTLEMEN,

* * * * *

On the grounds of public and national utility, therefore, I request that you will be pleased to direct the surgeon of every ship employed in Lord Exmouth's expedition to answer the following Queries, or any such, the medical commissioner of your Board may be pleased to substitute, with a view to the attainment of all the information we can reach on the important subject of amputation in gun-shot wounds.

Query 1st. How many wounds in the
late battle before Algiers occurred in the
c ship

ship of which you were surgeon that required amputation, and what was the nature of such wounds ?

Query 2d. Did you amputate during the action, or defer it until the action was terminated, so as to allow time for the constitution to recover from the shock and alarm a patient is said to labour under, who has been wounded in battle ?

Query 3d. When amputation was deemed necessary, at what precise period was the operation performed subsequently to the infliction of the wound ; *i. e.* how many days, hours, or minutes, to the best of your judgment, elapsed before the amputation took place ? This question is to apply to every amputation that occurred on board, or in hospitals, that may have come to your knowledge.

Query 4th. Of the patients amputated, how many recovered, and how many died ; and of those that died, how long did they survive the operation ?

I beg

I beg to assure the Board, that in making this request I am influenced by no other motives than the benefit of the public service and the advancement of surgical knowledge.

I am, &c.

(Signed) A. C. HUTCHISON.

The Commissioners for Transports, Sick
and wounded Seamen, &c. &c.

Transport Office, 18th Nov. 1816

SIR,

Dr. Harness, the medical commissioner, having proposed to the surgeons of the several ships named in the margin *, which were employed on the late expedition against Algiers, the four Queries stated in your letter of the 29th ultimo, I am directed by the Commissioners for Transports, &c. to enclose for your information copies of the

* Queen Charlotte, Impregnable, Superb, Albion, Minden, Leander, Glasgow, Hebrus, Granicus, Severn, Infernal.

answers which have been received from the whole of the said surgeons, with the exception of the surgeon of the Minden, from whom no answer has been as yet received, that ship being still employed on foreign service.

I am, SIR,

Your most humble Servant,

ALEX. M'LEAY, Secty.

To A. Copland Hutchison, Esq.
Spring Garden.

(Copy.)

A List of Wounds that occurred on board His Majesty's Ship Impregnable, in the Battle at Algiers, that required Amputation, with the Nature of the Wounds, &c. &c.

GENTLEMEN,

* * * * *

CASE I.

Mr. J. Hawker, midshipman, aged 18, had his right leg carried off at the knee-joint immediately before the explosion, by which latter accident he had his hands, neck, and leg severely burnt; his thigh was amputated about three hours and a half after he was brought to the cockpit; he was in tolerable spirits at the time of the operation, but died about an hour after it. This unfortunate young gentleman was discharged from the sick list the day before the action

CASE II.

John Keough, boy, aged 16, had his left leg carried off at the knee-joint by a large

c 3 splinter,

splinter, which also shattered the condyles of the femur; his thigh was amputated about three hours and three quarters after he was brought to the cockpit, and he expired immediately after the operation: this boy was naturally of a weak habit, and had lost a considerable quantity of blood before he was brought down, owing to the tourniquet having slackened; he was, however, in tolerable spirits previous to the operation, and was very desirous of its being performed.

CASE III.

Richard Pepper, serjeant of marines, had his left arm close to the shoulder-joint, and part of the pectoral and deltoid muscles, carried off by a cannon-shot; had also a severe splinter wound in his left leg. Amputation was performed at the shoulder-joint, about four hours after the wounds were received; he was in pretty good spirits at the time of the operation, but died about an hour after it.

CASE

CASE IV.

John Gaulter, private marine, aged 25, was stationed in the main-top, where, by a discharge of grape, he had his left arm carried off close to the shoulder-joint; his left thigh was fractured, and he had also a severe grape-shot wound in his loins. Amputation was performed at the shoulder-joint about four hours and a quarter after his appearance in the cockpit; he was rather low when the operation was performed, and expired just after it was finished. This unfortunate man was in the sick list for the cure of syphilis, which had been effected; but he was still under the influence of mercury, and consequently much debilitated.

CASE V.

Joseph Morrison, seaman, had his right leg carried off by a large shot close to the knee-joint, had also two severe contused wounds in the lower part of the abdomen

and groin, which would have terminated in extensive sloughing sores; his thigh was amputated about four hours and forty minutes after he was brought down; he appeared in tolerable spirits at the time of the operation, but expired an hour after in violent convulsions. It was said, that one of the burnt men, in a state of delirium, fell on his stump, to which cause the spasms were attributed. Sixteen arteries were secured, and no nerves included in the ligatures.

CASE VI.

John Murray, yeoman of the sheets, aged 28, had his left leg shattered by a cannon-ball a little above the ankle-joint, had also the tarsal and metatarsal bones of his right foot very much fractured, together with extensive laceration of the integuments covering the foot. The left leg was amputated below the knee, about five hours after he was brought down; just before the operation, he appeared in pretty good spirits, although of a weak habit; but
immediately

immediately after it, a degree of syncope came on, which prevented an amputation of the other extremity taking place; it was found necessary, however, to perform this last operation on the 2d of September, six days after the action. He died on the morning of the 6th of September in extreme debility.

CASE VII.

George Ryder, boy, aged 16, had his left leg carried off close to the knee by a cannon-shot; his thigh was amputated about five hours and a half after he was brought below, when he was in excellent spirits, and continued so for some time, but expired on the 30th of September of hectic fever. He was of a delicate habit.

CASE VIII.

William Hipwell, seaman, aged 35, had his right arm carried off a little above the elbow-joint, by a cannon-shot. Amputation was performed near the insertion of the deltoid muscle, about five hours and fifty minutes

after he was conducted to the cockpit, at which period he was in good spirits, and has since done remarkably well : he was sent to Plymouth Hospital on the 9th of October.

CASE IX.

John Dennis, seaman, aged 26, received an extensive wound on the back of the left hand, accompanied with a fracture of several of the metacarpal bones ; the radius and ulna of the same arm were also badly fractured, said to have been occasioned by a splinter. In a consultation, amputation was deemed necessary, which was performed on the 3d of September, seven days after the action, at which period he appeared in good spirits, and perfectly reconciled to the operation ; he died on the 10th of September, seven days after the operation, of a violent spasmodic affection of the abdominal and thoracic muscles ; in the course of which, the muscles of the lower jaw were, occasionally, strongly contracted. This unfortunate man was of a weak and irritable habit ; and, after the third day from the amputation, his countenance

countenance exhibited strong marks of approaching tetanus.

CASE X.

Daniel Moffett, seaman, aged 45, had his left foot very much shattered by a cannon-ball, which rendered amputation below the knee necessary on the 3d of September, seven days after the action; he was sent to Plymouth Hospital on the 9th of October, with his stump almost healed. This man was of an excellent habit of body.

CASE XI.

George Church, seaman, aged 42, received a compound fracture of the right tibia and fibula, accompanied with a considerable projection of bone and laceration of the integuments, which rendered amputation necessary on the 4th of September, eight days after the action. He was of a very irritable desponding habit, and had several severe paroxysms of intermittent fever subsequently to the amputation, which reduced him

him to a state of extreme debility; in consequence of which, it was found necessary to leave him at Gibraltar Hospital; and at the period of the ship's quitting that place, it was not expected he would live many hours. He had been in the hospital only three days when we sailed, and was sent there on the 12th*.

REMARKS.

The above is a faithful account of the wounds and amputations that occurred on board His Majesty's ship Impregnable, in and after the action at Algiers; by which it will appear, that the constitution in every instance had entirely recovered from the shock and alarm a patient labours under immediately after being wounded in battle. I cannot very readily account for the sudden dissolution of so many of the unfortunate men who underwent amputation, unless I take into account the other injuries they received, and the following probable cause,

* It has been since ascertained that this patient died.

which

which I must beg leave to submit to the judgment of Dr. Harness: namely, the intense heat those unfortunate men were unavoidably exposed to in the cockpit for many hours, and which, together with my exertions there for more than sixteen hours, produced an universal eruption over my body, and an extensive swelling of my inferior extremities. The thermometer, after the explosion, and consequent presence of seventy burnt men and boys, stood as high as from 136 to 140 ; and had I been of a weaker habit, I must inevitably have sunk under so long an exposure to such a degree of temperature; how much more then must the wounded have suffered !

The Queries Nos. 1, 3, and 4, are, I trust, answered in the foregoing statement ; and in answer to No. 2, I have to state, that I did not perform any amputation until the action was terminated ; and that it appeared to me, that the constitution of my patients had entirely recovered from the shock and alarm usually experienced on being wounded in battle. I have only farther to add, that the
amputations

amputations were performed in the customary manner*.

I am, &c.

A. MARTIN, Surgeon.

58, Clowance Street, Plymouth Dock,
4th November, 1816.

To the Commissioners for Transports, Sick
and wounded Seamen, &c. &c.

(Copy.)

No. 17, Great Suffolk Street, Charing Cross,
2d November, 1816.

GENTLEMEN,

In answer to the 1st Query, five men were wounded on board the *Granicus* by cannon-shot, in such a manner that they required amputation.

2d. The amputations were performed immediately after the ship left off action, which was about eleven o'clock at night.

* I feel it due to Mr. Martin to state, that, a few years ago, whilst that gentleman was surgeon of the *Duncan* 74, he sent to Deal Hospital, under my care, a man upon whom he had performed an amputation at the shoulder-joint; and I embrace this opportunity of offering my testimony of its having been an admirably formed stump.

3d.

3d. Four were wounded between four and five o'clock, and one at nine o'clock.

The first that suffered amputation, his left arm was shot off by a cannon-ball close up to the shoulder; the amputation was performed six hours and a half after he received the wound: he was the only patient that died, and had every appearance of doing well; but the great loss of blood sustained by this patient, previous to his removal to the cockpit, was, in my opinion, the occasion of his death.

The second was wounded about the same time as the first; the fore-arm was shot away about three inches above the articulation of the hand, and was amputated four inches below the elbow, six hours and a half after he was wounded. Cured on board.

The third was wounded about 5, 30, P. M.: he suffered amputation at twelve at midnight: his arm was shot off by a cannon-ball above the elbow: it was amputated four inches below the shoulder. Cured on board.

The

The fourth was wounded at 5, 40, P. M. : the arm was nearly shot off by a cannon-ball above the elbow ; the humerus being much shattered, it was amputated at 12, 40, A. M. five inches below the shoulder. Cured on board.

The last that suffered amputation was wounded by a cannon-ball at 9 P. M. : it carried the arm off at the shoulder ; the head of the humerus was shivered into various pieces ; part of the glenoid cavity was dissected out, as well as several pieces of the humerus which lodged about the axilla. He suffered amputation at 1, 20, A. M. Cured on the 28th of October.

4th *Query*. The patient that died, died forty-two hours after the amputation ; four recovered.

I have the honour to be, &c.

C. F. VANDERBURGH, Surgeon.

The Commissioners for Transports, Sick
and wounded Seamen, &c. &c. &c.

London, 1, James Street, Adelphi,

1st November, 1816.

GENTLEMEN,

Three cases requiring amputation occurred on board His Majesty's ship Glasgow, in the late action at Algiers.

The first was a man of colour, that had all the metacarpal bones of the right hand shattered by a grape-shot; the system did not seem much disordered, and upon administering some wine, amputation just above the wrist was immediately performed by the circular incision, and the stump healed nearly by the first intention.

The second was a man that had his left leg carried away at the knee by a round shot, while in the fore-top: he had lost a good deal of blood; but upon administering some wine, he seemed to have recovered so much as to admit of the operation, and it was performed perhaps an hour after the infliction of the wound; the stump was

D

healed

healed in the fourth week after the operation *.

The third was a negro, who had both arms carried away a little above the elbow

* Since I have been furnished with these documents, the surgeon of the Glasgow has related to me the following anecdotes of this patient. The man was captain of the fore-top : on his leg being so wounded, that only a small portion of integument kept it connected with the thigh, he, with the view of obtaining surgical aid as soon as possible, grasped a rope, by which to lower himself down upon deck. When he had reached half way, the mangled limb, over which he could not possibly have any control, became so entangled among other ropes, that he was under the necessity of raising himself upwards, about three feet, that he might disengage the wounded limb with the assistance of the sound one, whilst he was still hanging by his arms ; and having accomplished this end, he descended quietly upon deck.

When placed in the cockpit, and waiting till Mr. Stenhouse had completed the amputation of an arm in which he was then engaged, the bugleman's death by a cannon-shot was announced, whose wife was at this time employed in assisting the surgeon. The poor woman was instantly thrown into a violent paroxysm of grief ; and whilst she was thus bewailing her loss, the wounded captain of the top said, with much composure and naïveté, "Come, Poll, cease to grieve ; you shall not remain a widow long ; I will marry you myself directly that I am well !!" And I understand he has since fulfilled his promise.

by

by a round shot, and was, also, severely contused upon the chest with splinters. The operations were performed, perhaps, two hours after he was wounded. His principal complaint was oppression of breathing; he was put into a cot, and died in from half an hour to an hour afterwards, apparently from the injury of the chest.

I am, &c.

WM. STENHOUSE, Surgeon.

The Commissioners for Transports,

&c. &c. &c.

His Majesty's Ship *Superb*, at Plymouth,
12th Nov. 1816.

GENTLEMEN,

* * * * *

ANSWERS.

Query 1st. Amputation was performed on one person only on board the *Superb*; it was done above the knee, in consequence of a large grape-shot having perforated the joint.

Query 2d. The limb was amputated during the action, as soon as some intermis-

sion had taken place of wounded men coming down to the cockpit. It might be nearly two hours after the receipt of the wound. There was no shock or alarm of the system, to render it necessary to delay the operation. He has recovered.

Query 3d. During five years that I was surgeon of the Doris frigate, I had occasion to perform amputation only once: it was of the arm of a seaman who had the elbow-joint shattered by his falling from the mizen gaff in a gale of wind, which dispersed the invading French fleet on the coast of Ireland, about Christmas 1796. The operation was performed immediately after the accident, and the stump healed by the first intention.

When surgeon of the Raisonable, in the action of the 22d of July, 1805, with the fleet of France and Spain, three men had their limbs torn away by cannon-shot: viz.

Thomas Knight, aged about 26, a very muscular man, of short stature, at six o'clock, P. M. had the thigh shot away about the middle.

middle. When brought to the cockpit, he was very faint and languid, the pulse feeble and without resistance, the countenance ghastly, and there was a cold perspiration on the skin. When the action ceased, the operation was performed in three hours after the receipt of the wound. Little blood was lost during the amputation; however, he died exhausted in nineteen hours afterwards. Common nutriments and cordials were given in a moderate way, and he had an opiate.

Richard Beamsley, aged twenty-two years, landsman, had his arm shot away at the elbow. Three hours after the accident, I was about to amputate the arm, but he resisted it with such determined obstinacy, that I was obliged to attend to other wounded men. About ten o'clock, when I again insisted on the necessity of his undergoing the operation, he started up suddenly, became faint, and fell down. Thinking this proceeded from fear, and his dread of the operation, I put it off until two o'clock in the morning, at which time he still continued

lethargic, except when roused, or spoken to. The arm was taken off, but he died in the space of a few hours, which I could only ascribe to the loss of blood he had sustained previous to the operation.

John Bradbury, aged 23, seaman, had the right arm shot away very high. The humerus having been shivered longitudinally into two portions, as far as the glenoid cavity, the arm was amputated at the shoulder-joint, in about three hours after the accident, and was healed on board before the ship arrived in port. As the pressure of the tourniquet could scarcely be admitted, he was put under the care of a woman, who prevented bleeding before the operation, by pressing on the face of the wound with her hands.

On the 5th of December, 1808, the boats of the *Raisonable* having been employed in cutting a ship out from under the batteries of St. Rose, in the island of Bourbon, Philip Harold, a robust seaman, aged 28 years, had the elbow-joint perforated by a grape-

grape-shot. The head of the ulna was completely shattered, the radius dislocated, and the splinters of the broken bone spread about amongst the soft parts. There had been little loss of blood, and being under no trepidation whatever, instantly on coming on board, he submitted to the operation; and was cured by immediate adhesion in the space of a few days. The amputation was done in less than an hour after the accident.

On the 22d of September, 1809, Lieutenant Hawden, of the Royal Marines, employed with his party on shore, at the assault of St. Paul's, in the Isle of Bourbon, received a wound by a musket-bullet, in the patella, which penetrated its upper and outer angle. On visiting him on shore after the action, I strongly urged my opinion, that he should undergo immediate amputation; but it was opposed by a Dr. Davis, of the Bombay establishment, who attended the troops on the expedition, as he believed the limb might be saved: as he was supported in this opinion by a naval surgeon, the operation was de-

D 4

ferred.

ferred. The officer was brought on board the *Raisable*, where, notwithstanding the most rigid antiphlogistic treatment, every thing went wrong. A prodigious swelling of the limb took place from the groin to the instep, attended with an equally violent conflict of the system. Matter formed in the joint, which was discharged through the opening made by the bullet, only in certain positions of the limb. Hectic fever, with regular paroxysms and rigors, having become established, the amputation of the thigh was performed on the twelfth day, as the only means of giving him a chance for life. During the operation, a great discharge of matter took place, which was found to proceed from an abscess formed near the bone, and extending along it nearly to the groin. He survived the operation only four days.

In the summer of 1811, a seaman who had been wounded on board an American ship, in the *Great Belt*, was brought on board the *Cressy* six hours after the accident. He had lost two inches of the tibia, by two bullets fired by accident from a musket.

ket. He suffered amputation below the knee, and recovered.

Query 4th. In four amputations of the upper extremities, one died.

In four amputations of the lower extremities, two have died.

REMARKS.

Though not desired to make any comments, I hope it will not be deemed irrelevant to offer a few remarks in answer to the Queries of the Honourable Commissioners, which I presume are proposed with the view of ascertaining, with more precision, the period most proper for performing amputation in gun-shot wounds of the extremities.

Before the action of the 22d of July, 1805, in which my operations were so unsuccessful, I had formed a very erroneous opinion, derived from the theories of the day; namely, that in gun-shot wounds, the arteries
we

were so perfectly stunned or seared by the impulse of the ball, that very little or no bleeding took place. On that occasion, I was too well convinced that this was a visionary hypothesis, leading to the most dangerous consequences. On the contrary, I believe, whenever the great vessels of the thigh are divided in any open wound, in whatever way inflicted, that an impetuous flow of blood always takes place, which instantly brings life into extreme danger ; that it is only from the total cessation of circulation, or from the action of the heart and arteries instantly becoming languid, in consequence of this sudden depletion, that the opinion of their not bleeding has taken its origin. I can easily conceive, that several ounces of blood may be poured out from the great arteries of the thigh with every systole of the heart, so that, in the space of one minute, such a quantity may be lost, as may render the success of an operation very doubtful. In the attack on Algiers, Mr. Bowen, midshipman, aged 16, had the thigh shot away on the quarter-deck, within two inches of the groin. Having been struck
directly

directly in the centre of the thigh by a cannon-ball of large diameter, the mangled limb adhered by a few ragged muscles only; the bone was shivered into fragments towards the joint. When brought to the cockpit, though one of the temporary tourniquets had been applied very tightly round it on deck, there was a considerable quantity of blood dripping from the stump. I found him extremely exhausted, there being a cessation of the pulse at the wrist, a deadly paleness of the countenance, and the skin bedewed with a clammy sweat. There was, however, no nervous dejection; he was solicitous of having surgical assistance, and apparently would have submitted to any operation. In such a deplorable state of inanition, it would have been an unavailing act of cruelty, had I presumed to amputate at the hip-joint; he must, unquestionably, have died under the operation. He lived only an hour and a half after the receipt of the wound, and his name was put in the list of the killed. I was afterwards informed, that he lost a great quantity of blood on the instant he received the wound.

Revolving

Revolving in my mind, when on our passage to Algiers, the various contingencies of practice, that were likely to occur in a sanguinary contest, this sudden loss of blood, especially in great wounds of the thigh, was an occurrence which of all others I dreaded the most. That I might be enabled to counteract it as much as possible, I constructed about 100 temporary tourniquets, which were distributed through all parts of the ship, and amongst those who were to be employed in the boats; the officers and men were instructed in the manner of applying them, and informed, that in cases where a limb was carried away, there would be an immediate loss of blood, which could not fail of being very dangerous, unless the wounded man, or any person near, should grasp the face of the wound, and stop the bleeding, by pressing firmly with both hands until a tourniquet could be applied.

In a great number of violent gun-shot wounds of the extremities, I have never, except in those attended with excessive hæmorrhage, observed any constitutional
commotion

commotion which might have prevented any necessary operation from being immediately performed. I am, therefore, inclined to think, that the alarm or shock of the system, so fully dilated upon by Mr. Guthrie, in his late publication, must occur in those wounds where there are bleedings from the smaller arteries ; for he expressly says, that “ the wounds of the great arteries by cannon-shot are generally fatal.” In his Section on Amputation at the Hip-joint, in enumerating the cases which may render the primary operation necessary, he affirms, that those who had the thigh carried away by cannon-shot about the middle, died on the field of battle. I think it may be presumed, that he found a proportionate degree of danger when the limbs had been shot away still lower. This, in my opinion, constitutes a great difference between the practice of the army and naval surgeon in time of action. Those desperate wounds are all brought to the cockpit, in consequence of its proximity ; and in consequence of artillery being the chief instruments of offence, become the principal cases to be
operated

operated upon. As far as I can form a judgment, the hazard is not great in primary amputations after bloodless wounds, such as wounded joints, compound fractures, &c. occasioned by musketry and grape-shot : and these, I believe, form the greater part of military practice in the field.

Profiting from the experience of Mr. Guthrie, who recommends the free use of wine and stimulants, in cases of wounds attended with collapse, I had provided those remedies, and designed to have administered them in the late battle ; as no cases occurred which particularly required their use, I am unable to say what success would have attended that practice, or what degree of inanition they might have had the power of obviating*.

I am, &c.

JOHN ADAMSON, Surgeon.

H. M. S. Superb, in Hamoaze,
12th Nov. 1816.

To the Commissioners for Transports,
Sick and Wounded Seamen, &c.

* The administration of stimulants in such cases, was, I believe, first recommended by Mr. Little, a naval surgeon, in the London Medical and Physical Journal, several years before Mr. Guthrie published.

20, May's Buildings, St. Martin's Lane,
31st October, 1816.

SIR,

I beg that you will be pleased to lay before the Medical Commissioner of the Board, the following answers to the Queries contained in your letter of yesterday.

1st. One gun-shot wound of the leg, both bones fractured, the fracture of the tibia extending almost into the knee-joint: there was not much external hæmorrhage, but the blood had very much distended the cellular membrane. The amputation was performed above the knee.

2d. Deferred it until the action terminated.

3d. To the best of my judgment, about fourteen hours elapsed before the operation took place. I have no knowledge of any other amputation.

4th. At the time of the patient William Davis' discharge to Gibraltar hospital, and
when

when the ship sailed for England, twenty days after the operation, there was every probability of his recovery, although five days after the amputation hæmorrhage had taken place from the femoral artery, which, in consequence, was tied in the thigh with two ligatures, and the interspace divided.

I have not heard of the patient since we left Gibraltar.

I am, &c.

GEORGE CLAYTON,

Late Surgeon to the Infernal.

Alex. M'Leay, Esq. Sec.

&c. &c. &c.

After the first sheet of this pamphlet was thrown off by the printer, the Commissioners for sick and wounded Seamen, &c. very kindly transmitted me Dr. Dewar's Replies to the Queries contained in my letter of the 29th October last, relative to the amputations performed on board the Queen Charlotte. The Commissioners, by mistake, having transmitted

transmitted them in the first instance to the gentleman who was appointed acting-surgeon of that ship, in consequence of the promotion of Dr. Dewar to be Physician to the Fleet, shortly after the action. This delay in the document reaching me, will account for a seeming inaccuracy of statement, at page 7.

Dr. Dewar's paper, however, is so clear and interesting, on the subject in discussion, that I shall lay it before the public without comment.

(Copy.)

Edinburgh, 13th Jan. 1817.
17, West Nicolson Street.

SIR,

I have this day received your letter of the 9th inst. containing Queries relative to the amputations which were performed subsequent to the battle at Algiers: and I proceed to answer them in the order in which they are put.

2

Seven

Seven cases occurred on board the Queen Charlotte, which required primary amputation: viz. one of the shoulder-joint, two of the arm, one of the fore-arm, two of the thigh, and one below the knee. The destruction of parts, in all those cases, was so great, as to leave no doubt of the propriety of immediate amputation.

It was not my intention to have operated during the continuance of the action, unless forced to it by urgent circumstances. But after the action had lasted about six hours without a prospect, as I was told, of its coming to a conclusion, I proceeded to amputate, leaving two of the assistant-surgeons to afford assistance to such wounded as should be brought down while I was engaged in operating.

In one case, only, did I witness that great constitutional commotion which has been said generally to follow severe wounds; and so far from being deterred from undertaking the operation in this case, by this state of commotion,

commotion, I considered it an additional motive for proceeding to it without delay. The immediate consequences of the removal of the shattered limb in this case, were highly satisfactory—the commotion speedily diminished; and, in conversing with the patient some time afterwards, on the subject of the operation, he expressed himself in very strong terms of the relief he had experienced, from inexpressible suffering, by the operation. This amputation was performed at the shoulder-joint, a few minutes after the wound was received.

One operation, as I have stated above, was performed a few minutes after the receipt of the wound. Four were performed from four to six hours, and two on the following day, about eighteen or twenty hours after they were wounded. The two last amputations were not performed sooner, in consequence of the patients withholding their consent to the operation.

Of the amputations performed on board the Queen Charlotte, one terminated fatally.

One was discharged into his proper ship, the *Granicus*, three weeks after the operation, with the stump nearly healed ; and five were landed at Portsmouth, all either perfectly or nearly recovered.

The fatal termination of the unsuccessful case took place on the 38th day after the operation. He had been struck on the left side by a large bar of iron, which destroyed a portion of the pectoral muscle and the soft parts of the side as low as the eighth or ninth rib ; divided the axillary plexus of vessels and nerves ; shattered the humerus into numerous portions, with perfect destruction of the soft parts on the fore part of the shoulder ; and of the posterior fold of the arm-pit, leaving only a small triangular portion of the back part of the deltoid, which was, however, sufficient to cover the glenoid cavity, after the removal of the head of the humerus.

An enormous wound remained uncovered, from which extensive sloughing took place ;

every thing, however, promised a favourable termination. The ligature of the axillary artery came away on the fourteenth day; the wound was healthy, and contracting rapidly; and his general health was improving, although he suffered from a disease of the bowels of long standing, unconnected with his wound.—But, on the twenty-ninth day after the operation, hæmorrhage unexpectedly took place. On removing the dressings the bleeding ceased. It returned the following morning, and it was then ascertained to proceed from the axillary artery. An incision was made in the course of the artery, and by cautious dissection it was separated from the surrounding parts, and cleanly secured with a ligature about $\frac{3}{4}$ ths of an inch below the clavicle. In cutting down on the artery, the edge of the knife came in contact with a sharp splinter of bone placed directly over it, which had caused ulceration of its coats, and consequent hæmorrhage. Not more than a pound of blood was lost; his strength was, however, much reduced by the loss, and he sunk on the eighth day after

the artery was secured, no return of hæmorrhage having taken place.

I have thus endeavoured to reply to the different Queries, in as clear and concise a manner as I can, confining myself as nearly as possible to a bare statement of facts, without venturing to offer any opinion or observation of my own, which the occurrences referred to, may have suggested. I beg to add, that no case occurred which required secondary amputation : and that the patient, whose case is related above, was the only one of the wounded on board the Queen Charlotte, who died after the action.

I am, &c.

ALEX. DEWAR, M.D.

Alex. M'Leay, Esq. Sec.
&c. &c. &c.

(Copy.)

18, Arundell Street, Panton Square,
London, 1st Nov. 1816.

SIR,

In answer to your letter of the 30th ultimo, I have to acquaint you for the information of the Commissioners for Transports, &c. 1st, That in my opinion there were twenty wounds on board the *Leander*, which required amputation: sixteen of which were from cannon, bar, or double-headed shot, fracturing the bones, lacerating the soft parts, and tearing the blood-vessels and nerves asunder. One was a fracture of the femur, and laceration of the thigh by a piece of langrage; and three were fractures by musketry, the latter of which I conceived it necessary to endeavour to preserve, though contrary to my own opinion on this subject.

2d. I amputated during the action, and did not defer it until the constitution recovered from the shock and alarm the patients might have laboured under, none of

them having exhibited that derangement of the sensorium so frequently described by authors on gun-shot wounds; and from its being my decided opinion, that the knife immediately following the injury, was the most effectual mode of securing the patient from such nervous or sensorial irritation.

3d. I amputated immediately on the patient's arrival in the cockpit, if I could get near him from the pressure of other wounds, and every one was amputated within half an hour after his removal to the cockpit.—Of the three which I attempted to save, one is likely to preserve his limb; he has suffered, and will continue to suffer much, and he now laments that he did not accede to my proposal to amputate. One lost his thigh at Haslar hospital, about the thirty-fourth day after the battle, and died a few days afterwards. The other lost his left arm, very high up, and is doing well.

In answer to your fourth Query, I shall herewith subjoin a list of the amputations, with their nature, &c. which, I trust, will afford you the information required.

LIST OF AMPUTATIONS

*Performed on board H. M. Ship LEANDER,**August 27th, 1816.*

NAME.	QUALITY.	NATURE OF AMPUTATION.	REMARKS.
Captain Wilson....	Marines.	Both thighs, (very high).	Died in a few hours.
David Barry.....	Seaman.	Both thighs, (very high).	Ditto.
Timothy Sullivan..	Ditto.	Hip-joint.	Died shortly after.
Michael Holland..	Sergeant.	Left thigh.	Sent to Hospital, Sept. 30th.
Thomas Farrell...	Seaman.	Ditto.	Ditto, Ditto.
Cornelius Wells...	Ditto.	Ditto.	Ditto, Ditto.
Francis Coldthread.	Ditto.	Right thigh.	Ditto, Ditto.
John Williams.....	Ditto.	Ditto.	Died of phthisis, Sept. 10th, stump just cicatrised.
John Taylor.....	Marine.	Left thigh.	Died of fever, Sept. 20th, stump cicatrised.
Pat Brabazon.....	Sergeant.	Right arm.	Cured.
John Martin.....	Seaman.	Ditto.	Ditto.
Henry Roofs.....	Ditto.	Left arm and cranium fractured.	Sent to Hospital. Convalescent.
James Walker....	Ditto.	Ditto fore-arm.	Cured.
Joseph Mascall...	Ditto.	Ditto.	Ditto.
A Seaman, name unknown, and belonging to another ship.....	—	Left thigh. Arm fractured, and much bruised about the chest.	Died shortly.

Convalescent.

Captain Wilson had both his limbs torn off by a double-headed shot ; and David Barry had his carried away by a cannon-ball—they were amputated as high as possible, by the circular incision. Both were very unfavourable subjects for an operation with impaired constitutions.—Barry had had ulcers and varicose veins. Sullivan had a dreadful wound ; his arm was fractured, and he had also a wound in the breast. The man whose name is unknown, was thrust through the stern-port, from one of the gun-boats. His thigh was fractured and cruelly lacerated ; his arm was also fractured, and he was much bruised. Williams was consumptive on his entering on board the ship ; and I never had any hopes of his recovery. Taylor's stump had healed by the first intention, when he was seized with fever, and died on the 20th September, having resisted every effort for his recovery. The pestilential easterly wind of Gibraltar produced the fever, and it was only checked by our removal from that focus of disease. For further
particulars

particulars I shall refer you to my letter of the 28th September *.

I am, &c.

D. QUARRIER, M. D.
Surgeon, Leander.

(Copy.)

H. M. Ship Severn, Motherbank,
28th November, 1816.

SIR,

In compliance with your letter of the 30th October, proposing certain questions relative to the operations performed in the action at Algiers, I have the honour of transmitting the following answers.

ANSWER 1ST.

Four wounds occurred requiring amputation. In one case a musket-ball passed in a

* The letter alluded to in the text, has been read to the Medical and Chirurgical Society; and voted, I believe, for publication in their next volume of Transactions; to which the author trusts he may be permitted to refer, for a very interesting and animated report of the state of the wounded on board the Leander in the bombardment of Algiers.

slanting

slanting direction through the arm, fracturing the os humeri. In the second, the leg was shattered by a cannon-shot, close to the knee, and left attached behind, by, only, a small portion of muscle. In the third case, the leg was carried off entirely by a cannon-shot on board of a gun-boat. The fourth, the leg was shattered by a cannon-ball, and left hanging, as in the second case; but, in coming down the fore-rigging, he received a wound by a splinter below the patella of the same knee.

ANSWER 2D.

All the amputations were performed during the action. I did not perceive symptoms of any particular shock or alarm, under which patients in that situation have been said to labour, all of them appearing uncommonly collected. The first case, a midshipman of about twenty years of age, came down out of the fore-top, with very little assistance. In the third case, the man was so completely collected, that he took the handkerchief off his neck, and tied it himself about

about the stump. The fourth (the captain of the fore-top) was wounded in the fore-top, and came by himself half way down the rigging, when he was wounded in the knee; the pain of which he described as more acute than the first wound.

ANSWER 3D.

On the first patient the operation was performed a very few minutes after he got down to the cockpit, which was also the case with the second. In the third, the man was wounded in a gun-boat, about half past three in the afternoon, and he was brought on board of this ship, about two hours afterwards: I was at that time completing the former amputation, and think I began with him about six, p. m. The last man must have waited nearly an hour, as he was brought down with several others, and had to wait his turn.

As to the latter part of this question, I did not send any patients to an hospital.

ANSWER

ANSWER 4TH.

All have recovered.

I am, &c.

ANDREW LESLIE, Surgeon.

To Alex. M'Leay, Esq. Sec.

&c. &c. &c.

Among the wounded on board the Albion and Hebrus, not any case occurred that required amputation.

In a conversation the author has had with the surgeon of the Impregnable, since the preceding sheets were thrown off, that gentleman has particularly requested him to state, the delay in amputating on board that ship was occasioned more by necessity than choice.

I feel it my duty to insert the subjoined letter from my friend Dr. Baird, as connected with these papers, and as it so strongly corroborates the propriety and necessity of amputating, in gun-shot wounds, without *any* delay. The Doctor's opinion will carry peculiar weight, when it is known, that his opportunities of forming a judgment on this important subject, have been numerous and extensive, particularly for the last thirteen years ; during which period he has filled the station of Inspector of Naval Hospitals, &c. &c. with the most unwearied zeal, and great benefit to the public service.

At the Earl of St. Vincent's,
Rochetts, 20th of October, 1816.

DEAR SIR,

Although you are fully in possession of my opinion respecting the propriety of immediate amputation in all cases of gun-shot wounds in which this operation shall appear indispensably necessary; yet, if
any

64 ON AMPUTATION IN GUN-SHOT WOUNDS.

any further evidence were wanting, I have had it fully established, in my late visit to the wounded seamen and marines landed from Lord Exmouth's squadron, at Haslar and Plymouth hospitals. Indeed, I cannot well conceive a more culpable practice, than that of deferring an operation longer than the surgeon can give his time to perform it, leaving the patient suffering under all the irritation and pain of a shattered limb, independent of approaching and increasing inflammation; whilst an immediate amputation would free him of the former, and lessen the chance of the latter.

I am, dear Sir,

Faithfully yours,

ANDREW BAIRD.

Alex. C. Hutchison, Esq.

THE END.

